IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	David HAYNER, et al.		
Title:	DECOUPLING TECHNIQUE FOR OPTICAL PICKUP UNITS		
App. No.:	10/600,637	Filed:	June 20, 2003
Examiner:	Kim Kwok CHU	Group Art Unit:	2627
Customer No.:	34814	Confirmation No.:	7168
Atty. Dkt. No.:	1280-SC12755TS		

Mail Stop Appeal Brief - Patents
The Board of Patent Appeal and Interferences
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

BRIEF IN SUPPORT OF APPEAL

Ryan S. Davidson, Reg. No. 51,596
LARSON NEWMAN ABEL POLANSKY & WHITE LLP
(512) 439-7100 (phone)
(512) 439-7199 (fax)

This brief contains these items under the following headings, and in the order set forth below (37 C.F.R. § 41.37(c)(1)):

TABLE OF CONTENTS

The final page of this brief before the beginning of the Appendix of Claims bears the agent's signature.

I. REAL PARTY IN INTEREST (37 C.F.R. § 41.37(c)(1)(i))

The real party in interest in this appeal is Freescale Semiconductor, Inc., the assignee in the entirety, as evidenced by the assignment recorded at Reel 015360, Frame 0718.

II. RELATED APPEALS AND INTERFERENCES (37 C.F.R. § 41.37(c)(1)(ii))

There are no interferences or other appeals that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS (37 C.F.R. § 41.37(c)(1)(iii))

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

There are seventeen (17) claims pending in the application.

B. STATUS OF ALL THE CLAIMS

1. Claims pending:

   Claims 21-37.

2. Claims withdrawn from consideration but not canceled:

   NONE.

3. Claims allowed:

   NONE.

4. Claims objected to:

   NONE.

5. Claims rejected:

   Claims 21-37 are rejected under 35 U.S.C. § 102(b).

6. Claims canceled:

NONE.

C. CLAIMS ON APPEAL

There are seventeen (17) claims on appeal, claims 21-37.

IV. STATUS OF AMENDMENTS (37 C.F.R. § 41.37(c)(1)(iv))

No amendments have been submitted subsequent to the final Office Action mailed October 16, 2007 (hereinafter, "the Final Action").

V. SUMMARY OF THE CLAIMED SUBJECT MATTER (37 C.F.R. § 41.37(c)(1)(v))

The following summary is provided to give the Board the ability to quickly determine where the claimed subject matter appealed herein is described in the present application and is not to limit the scope of the claimed invention.

Independent claim 21 recites the features of a device comprising: a first actuator control law portion (e.g., focus control law 302, FIG. 3) comprising an input to receive a representation of a first actuator position (see, e.g., input from focus sensor 320 and para. 0019), and an output; a second actuator control law portion (e.g., tracking control law 304, FIG. 3) comprising an input to receive a representation of a second actuator position (see, e.g., input from tracking sensor 322 and para. 0019), and an output; and a first actuator decoupler portion (e.g., decoupler 306, FIG. 3) comprising a first input coupled to the output of the first actuator control law portion and a second input coupled to the output of the second actuator control law portion, and an output to provide a signal with decoupling compensation for a first actuator (e.g., focus actuator 308, FIG. 3) based on the representation of the second actuator position (see, e.g., paras. 0019-0023).

Independent claim 23 recites the features of an optical disk drive (e.g., portion 100 of an optical disk drive, FIG. 1) comprising: a focus control loop (e.g., focus control law 402, actuator decoupler 406, lens motors 408, optical pickup unit mechanics 410, optical pickup unit sensor 412, and sensor decoupler 414, FIG. 4); a tracking control loop (e.g., tracking control law 404, lens motors 408, optical pickup unit mechanics 410, optical pickup unit sensor 412, FIG. 4), wherein the focus control loop and the tracking control loop are cross-coupled, wherein a focus control command (e.g., Tz, FIG. 4) excites the tracking control loop and a tracking control command (e.g., Tx, FIG. 4) excites the focus control loop (see cross-coupling represented in lens motors 408 and OPU sensor 412, FIG. 4, see also para. 0025); and a decoupler (e.g., actuator decoupler 406, FIG. 4) configured to produce a modified focus control command (e.g., Tz + tx, FIG. 4) from the focus control command and the tracking control command, and configured to produce a modified tracking control command (e.g., Tx + tz) based on the tracking control command and the focus control command (see, e.g., para. 0025), wherein the modified focus control command has a different excitation of the tracking control loop than the focus control command and wherein the modified tracking control command has a different excitation of the focus control loop than the tracking control command (see, e.g., paras. 0019-0023, 0025 and 0026).

Independent claim 26 recites the features of a method comprising: determining cross-coupling characteristics of a focus actuator (e.g., focus actuator 308, FIG. 3) and a tracking actuator (e.g., tracking actuator 310, FIG. 3) of an optical pickup unit (see, e.g., step 504, FIG. 5 and para. 0028); and determining a decoupling matrix to decouple the focus actuator and the tracking actuator (see, e.g., step 506, FIG. 5 and paras. 0031-0041).

Independent claim 31 recites the features of an optical disk drive (e.g., portion 100 of an optical disk drive, FIG. 1) comprising: a lens assembly (e.g., lens assembly 105, FIG. 1); a focus actuator (e.g., focus actuator 308, FIG. 3) that is configured to move the lens assembly in a focus direction; a tracking actuator (e.g., tracking actuator 310, FIG. 3) that is configured to move the lens assembly in a tracking direction; and a decoupler (e.g., decoupler 306, FIG. 3) configured to decouple the focus actuator from the tracking actuator by reducing signal cross coupling (see, e.g., paras. 0019-0023).

Independent claim 36 recites the features of an optical disk drive (e.g., portion 100 of an optical disk drive, FIG. 1) comprising: means for determining cross-coupling characteristics of a focus actuator (see e.g., focus actuator 308, FIG. 3) and a tracking actuator (see, e.g., tracking actuator 310, FIG. 3); and means (e.g., decoupler 306, FIG. 3, actuator decoupler 406, FIG. 4, see also para. 0024 (implemented "as part of processor 320" as "software algorithms" or "with other circuitry, as integrated circuits" or "mechanical devices")) for determining a decoupling matrix (see, e.g., paras. 0021, 0031-0042) to decouple the focus actuator and the tracking actuator (see, e.g., paras. 0022 and 0026).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL (37 C.F.R. § 41.37(c)(1)(vi))

Claims 21-37 are rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 6,298,019 (hereinafter, "Watanabe") as set forth in the Final Action.

VII. ARGUMENTS (37 C.F.R. § 41.37(c)(1)(vii))

As illustrated by the arguments and issues below, the independent claims has a unique set of issues relating to its rejection and appeal. For purposes of this appeal, independent claim 21 and its dependent claim 22 stand or fall together, independent claim 23 and its dependent claims

24 and 25 stand or fall together, independent claims 26 and 36 and their dependent claims 27-30 and 37 stand or fall together, and independent claim 31 and its dependent claims 32-35 stand or fall together.

In Section 3 of the Final Action, claims 21-37 were rejected under 35 U.S.C. § 102(b) as anticipated by Watanabe. As stated by M.P.E.P. § 706.02, "for anticipation under 35 U.S.C. 102, the reference must teach every aspect of the claimed invention either explicitly or impliedly. Any feature not directly taught must be inherently present." The Office bears the burden of presenting at least a *prima facie* case of anticipation. *In re Sun*, 31 USPQ2d 1451, 1453 (Fed. Cir. 1993) (unpublished).

1. Rejection of Claims 21 and 22

For ease of reference, independent claim 21 is reproduced in its entirety below:

21. (Previously Presented) A device comprising:

a first actuator control law portion comprising an input to receive a representation of a first actuator position, and an output;

a second actuator control law portion comprising an input to receive a representation of a second actuator position, and an output;

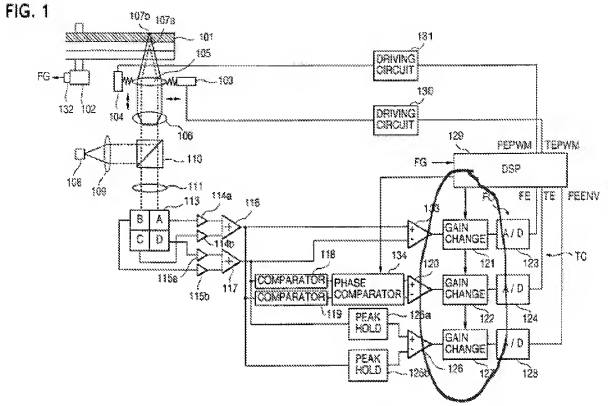
a first actuator decoupler portion comprising a first input coupled to the output of the first actuator control law portion and a second input coupled to the output of the second actuator control law portion, and an output to provide a signal with decoupling compensation for a first actuator based on the representation of the second actuator position.

a) Watanabe fails to disclose a signal with decoupling compensation as recited by claim 21

Independent claim 21 recites the features of "a first actuator decoupler portion comprising a first input coupled to the output of the first actuator control law portion and a

second input coupled to the output of the second actuator control law portion, and an output to provide a signal *with decoupling compensation for a first actuator based on the representation of the second actuator position*." The Final Action asserts that the DSP 129 of Watanabe discloses the recited "first actuator decoupler portion." *Final Action*, p. 5. In particular, the Office asserts that Watanabe discloses the recited features "to provide a signal with decoupling compensation for a first actuator based on the representation of the second actuator position" in that Watanabe teaches that the signal TC "is compensated by a gain change means 122 which [is] *based on the gain change 121 of the second actuator control law portion [differential amplifier] 133*." *Id.*, p. 5 (emphasis added). In a prior Office Action, the Office clarifies this interpretation in stating "[e]ach servo operation [tracking and focusing] is compensated by its gain change means (121, 122, 127) and all the gain change means are connected as a loop to the servo processor [DSP] 129. *In other words, the output of one actuator control signal is based/affected by the actuator control signal because their gain compensation is a series loop*." *Non-Final Office Action mailed May 3, 2007*, p. 3 (emphasis added).

A review of the disclosure of Watanabe fails to reveal any support for the Office's position that Watanabe teaches that the gain change circuits 121, 122, and 127 are connected or cascaded in series or that the output of one actuator control signal affects another actuator control signal in any manner. It is noted that the Office does not cite any particular passage of Watanabe in support of its assertion that the gain change circuits 121, 122, and 127 are looped together or affected by each other in any way. As best understood, the Office appears to base its assertion that the gain change circuits 121, 122, and 127 are cascaded in series based on the particular use of drafting lines in Figure 1 of Watanabe, as illustrated below:



Watanabe, FIG. 1 (marks added)

Judging by the arrangement of the drawing elements around the DSP 129 and the gain change circuits 121, 122, and 127, the particular illustration of the sequence of arrows between the gain change circuits 121, 122 and 127 appears to be an effort to avoid cluttering the drawing, which would occur if individual lines between the DSP 129 and the gain change circuits 121, 122, and 127 were used instead. Accordingly, the alleged "series" connections between the gain change circuits 121, 122, and 127 is merely a drafting artifact. As noted above, the written description of Watanabe contains no teaching that the gain change circuits 121, 122, and 127 are connected together in a serial manner or are affected by each other. This argument is further consistent with Figures 2, 10, 24, 26, and 27, which illustrate embodiments of the DSP 129 with respect to the gain change circuits 121, 122, and 127, fail to show any connection between the gain change circuits 121, 122, and 127. Accordingly, the Office's interpretation of Watanabe as

teaching series-connected gain change circuits 121, 122, and 127 is unreasonable and unsupported by the disclosure of Watanabe.

In the Final Action, the Office responds by stating that "all the gain change means 121, 122, and 127 are physically bridged together by the DSP 129" and that "the DSP 129 still receives input signals from all gain change means 121, 122 and 127 and output control signals to the gain change means according to the inputted signals as a single combined servo loop." *Final Action*, p. 2. The Office further asserts that decoupling compensation is provided in that Watanabe "teaches that the tracking gain is learned at the previous focus jumping (column 39, lines 27-34). In other words, the prior art of Watanabe teaches 'to provide a signal (track gain) with decoupling compensation (optimal) for a first actuator (tracking servo) based on the representation of the second actuator position (focusing jumping)'." *Id*, p. 3. The passage of Watanabe relating to the embodiment encompassing the relied-upon passage teaches a technique for learning the tracking gain of the tracking servo by creating a disturbance and then calculating a correction value with which the tracking gain can be corrected. *Watanabe*, col. 38, line 24 to col. 39, line 34 ("Embodiment 10"). In particular, Watanabe teaches that this learning technique can be initiated by a focus jumping, but ***Watanabe fails to disclose that this learned tracking gain of the tracking control has any effect on the focus control or vice versa, or that there is cross-coupling between the focus control and the tracking control in any manner.*** Rather, Watanabe merely teaches that an event in the focus control, i.e., focus jumping, can be used to initiate the tracking gain learning process. ***Neither this passage nor any other passage of Watanabe discloses or suggests that any control signal includes decoupling compensation in any manner***, and thus Watanabe fails to disclose at least the features of "an output to provide a

signal *with decoupling compensation for a first actuator based on the representation of the second actuator position"* as recited by claim 21.

b) Claims 21 and 22 are allowable under 35 U.S.C. § 102(b)

For at least the reasons provided above, Watanabe fails to disclose each and every feature recited by claim 21, and thus also fails to disclose each and every feature recited by dependent claim 22. Accordingly, the Office fails to establish a sufficient showing of anticipation in support of its rejection of claims 21 and 22. Claims 21 and 22 therefore are allowable under 35 U.S.C. § 102(b).

2. Rejection of Claims 23-25

For ease of reference, independent claim 23 is reproduced in its entirety below:

23. (Previously Presented) An optical disk drive comprising:

a focus control loop;

a tracking control loop, wherein the focus control loop and the tracking control loop are cross-coupled, wherein a focus control command excites the tracking control loop and a tracking control command excites the focus control loop; and

a decoupler configured to produce a modified focus control command from the focus control command and the tracking control command, and configured to produce a modified tracking control command based on the tracking control command and the focus control command, wherein the modified focus control command has a different excitation of the tracking control loop than the focus control command and wherein the modified tracking control command has a different excitation of the focus control loop than the tracking control command.

a) Watanabe fails to disclose a focus control command excites a tracking control loop and a tracking control command excites a focus control loop as recited by claim 23

Independent claim 23 recites the features of "a focus control loop," a tracking control loop," "wherein the focus control loop and the tracking control loop are cross-coupled," and "wherein a focus control command excites the tracking control loop and a tracking control command excites the focus control loop." The Office again relies on the unsupported interpretation of Watanabe as teaching that the operations of the gain change circuits 121, 122, and 127 are dependent on each other. *Final Action*, p. 6. As discussed above with respect to claim 21, Watanabe discloses no such relationship. As a first issue, Watanabe fails to disclose that there is cross-coupling between the tracking control and the focus control of the system of Watanabe. Secondly, Watanabe fails to disclose that a tracking control command on the tracking component of Watanabe excites the focus component of Watanabe, or vice versa, in any manner. Although the Office attempts to demonstrate cross-coupling and mutual excitation by way of the DSP 129 of Watanabe, Watanabe merely discloses that events in one of the tracking component or focus component can serve to initiate an operation in the other, but one of ordinary skill in the art will readily appreciate that a triggering event does not serve to excite a control loop as provided by claim 23.

b) Watanabe fails to disclose the decoupler feature recited by claim 23

Claim 23 also recites the features of "a decoupler configured to produce a modified focus control command from the focus control command and the tracking control command, and configured to produce a modified tracking control command based on the tracking control command and the focus control command, *wherein the modified focus control command has a*

different excitation of the tracking control loop than the focus control command and wherein the modified tracking control command has a different excitation of the focus control loop than the tracking control command." Watanabe fails to disclose that a focus control signal is modified based on a tracking control signal, or vice versa. Further, Watanabe fails to disclose that any modified control command so created has a different excitation of the corresponding control loop compared to the unmodified control command. Thus the Office fails to establish that Watanabe discloses at least the above-identified features of independent claim 23.

c) Claims 23-25 are allowable under 35 U.S.C. § 102(b)

For at least the reasons provided above, Watanabe fails to disclose each and every feature recited by claim 23, and thus also fails to disclose each and every feature recited by dependent claims 24 and 25. Accordingly, the Office fails to establish a sufficient showing of anticipation in support of its rejection of claims 23-25. Claims 23-25 therefore are allowable under 35 U.S.C. § 102(b).

3. Rejection of Claims 26-30, 36 and 37

For ease of reference, claims 26 and 36 are reproduced in their entireties below:

26. (Original) A method comprising:

determining cross-coupling characteristics of a focus actuator and a tracking actuator of an optical pickup unit; and

determining a decoupling matrix to decouple the focus actuator and the tracking actuator.

36. (Original) An optical disk drive comprising:

means for determining cross-coupling characteristics of a focus actuator and a tracking actuator; and

means for determining a decoupling matrix to decouple the focus actuator and the tracking actuator.

a) Watanabe fails to disclose determining cross-coupling characteristics as recited by claims 26 and 36

Independent claim 26 recites the features of "determining cross-coupling characteristics of a focus actuator and a tracking actuator of an optical pickup unit." Independent claim 36 recites similar features. With respect to these features, the Office asserts "gain means 121, 122 and 127 for focusing and tracking operations are a servo loop which can be considered as a cross-coupling characteristics [sic]." *Final Action*, p. 7. As discussed above, the Office's interpretation of the gain change circuits 121, 122 and 127 as a servo loop is unsupported and thus unreasonable. Regardless, even if it is assumed, *arguendo*, that Watanabe teaches that the operations of the gain change circuits 121, 122, and 127 affect each other and it is also assumed that this affect is cross-coupling, the Office fails to establish how Watanabe teaches the ***determination*** of these alleged "cross-coupling characteristics" between the gain change circuits 121, 122, and 127 (noting that Watanabe fails to disclose the term "cross-couple" or its variants in any manner). Further, Watanabe fails to address cross-coupling between actuators, and the characteristics thereof, in any way. Accordingly, Watanabe fails to disclose determining cross-coupling characteristics of a focus actuator and a tracking actuator as provided by claim 26, or means thereof as recited by claim 36.

b) Watanabe fails to disclose determining a decoupling matrix as recited by claims 26 and 36

Independent claim 26 further recites the features of "determining a decoupling matrix to decouple the focus actuator and the tracking actuator" and independent claim 36 recites similar features. With respect to these features, the Office asserts that the "DSP 129 and gain change means [121, 122, and 127] [form] a servo loop which can be considered as a de-coupling matrix of tracking and focusing." *Final Action*, pp. 7-8. Thus, the Office is interpreting the alleged "servo loop" of the DSP 129 and the gain change circuits 121, 122, and 127 as both the recited "cross-coupling characteristics" and the "decoupling matrix" which is determined from the "cross-coupling characteristics." In addition to the lack of support for the Office's interpretation of Watanabe as teaching the alleged "servo loop," ***the Office fails to provide any description of how the term "decoupling matrix" has been reasonably interpreted and, consequently, how Watanabe discloses this reasonable interpretation of "decoupling matrix."*** Further, even if it is assumed, *arguendo*, that the alleged "servo loop" of the DSP 129 and the gain change circuits 121, 122, and 127 constitutes a "decoupling matrix," the Office fails to establish how Watanabe ***determines*** the "decoupling matrix"/"servo loop", much less how Watanabe determines the "decoupling matrix"/"servo loop" based on the "servo loop" (which the Office also interprets as the "cross-coupling characteristics" from which the "decoupling matrix" is determined as provided by claims 26 and 36). Accordingly, the Office fails to establish that Watanabe discloses at least the above-identified features of claims 26 and 36.

c) Claims 26-30, 36 and 37 are allowable under 35 U.S.C. § 102(b)

For at least the reasons provided above, Watanabe fails to disclose each and every feature recited by independent claims 26 and 36, and thus also fails to disclose each and every feature

recited by dependent claims 27-30 and 37. Accordingly, the Office fails to establish a sufficient showing of anticipation in support of its rejection of claims 26-30, 36, and 37. Claims 26-30, 36, and 37 therefore are allowable under 35 U.S.C. § 102(b).

4. Rejection of Claims 31-35

For ease of reference, claim 31 is reproduced in its entirety below:

31. (Previously Presented) An optical disk drive comprising:

a lens assembly;

a focus actuator that is configured to move the lens assembly in a focus direction;

a tracking actuator that is configured to move the lens assembly in a tracking direction; and

a decoupler configured to decouple the focus actuator from the tracking actuator by reducing signal cross coupling.

a) The Office fails to establish a prima facie *case of anticipation for claim 31*

The Final Action does not provide any rationale for its rejection of claim 31, and thus the Office fails to establish a *prima facie* rejection of claim 31.

b) Watanabe fails to disclose a decoupler configured to decouple a focus actuator from a tracking actuator by reducing signal cross coupling as recited by claim 31

Independent claim 31 recites the features of "a decoupler configured to decouple the focus actuator from the tracking actuator by reducing signal cross coupling." In its discussion of claim 32, which depends from claim 31, the Office again relies on the unsupported and unreasonable interpretation of Watanabe as teaching interlinked gain change circuits 121, 122, and 127. *Final Action*, p. 8 ("gain change means 121, 122 and 127 are cascaded in a series mode which modifies a tracking mode and a focusing mode"). Regardless, Watanabe fails to address

signal cross coupling, or the reduction thereof, in any manner. Watanabe therefore necessarily fails to disclose a decoupler that decouples a focus actuator from a tracking actuator by reducing signal cross coupling as provided by claim 31.

b) Claims 31-35 are allowable under 35 U.S.C. § 102(b)

For at least the reasons provided above, Watanabe fails to disclose each and every feature recited by independent claim 31, and thus also fails to disclose each and every feature recited by dependent claims 32-35. Accordingly, the Office fails to establish a sufficient showing of anticipation in support of its rejection of claims 31-35. Claims 31-35 therefore are allowable under 35 U.S.C. § 102(b).

VIII. CONCLUSION

For at least the reasons given above, all pending claims are allowable and the Appellants therefore respectfully requests reconsideration and allowance of all claims and that this patent application be passed to issue.

Respectfully submitted,

September 8, 2008
Date

/Ryan S. Davidson/
Ryan S. Davidson, Reg. No. 51,596
LARSON NEWMAN ABEL POLANSKY & WHITE, LLP
(512) 439-7100 (phone) (512) 327-5452 (fax)

IX. APPENDIX OF CLAIMS INVOLVED IN THE APPEAL (37 C.F.R. § 41.37(c)(1)(viii))

The text of each claim involved in the appeal is as follows:

21. (Previously Presented) A device comprising:

a first actuator control law portion comprising an input to receive a representation of a first actuator position, and an output;

a second actuator control law portion comprising an input to receive a representation of a second actuator position, and an output;

a first actuator decoupler portion comprising a first input coupled to the output of the first actuator control law portion and a second input coupled to the output of the second actuator control law portion, and an output to provide a signal with decoupling compensation for a first actuator based on the representation of the second actuator position.

22. (Previously Presented) The device, as recited in Claim 21, wherein the first actuator decoupler comprises a linear modification module having an input coupled to the output of the second actuator control law portion, and an output to provide a linearly scaled representation of a value received at its input; wherein the linearly scaled representation is used to provide the signal with decoupling compensation for the first actuator decoupler portion.

23. (Previously Presented) An optical disk drive comprising:

a focus control loop;

a tracking control loop, wherein the focus control loop and the tracking control loop are cross-coupled, wherein a focus control command excites the tracking control loop and a tracking control command excites the focus control loop; and

a decoupler configured to produce a modified focus control command from the focus control command and the tracking control command, and configured to produce a modified tracking control command based on the tracking control command and the focus control command, wherein the modified focus control command has a different excitation of the tracking control loop than the focus control command

and wherein the modified tracking control command has a different excitation of the focus control loop than the tracking control command.

24. (Original) The optical disk drive as recited in Claim 23, further comprising:
a lens assembly, wherein the focus loop comprises a focus actuator configured to move the lens assembly in a focus direction.

25. (Original) The optical disk drive as recited in Claim 23, further comprising:
a lens assembly, wherein the tracking loop comprises a tracking actuator configured to move the lens assembly in a tracking direction.

26. (Original) A method comprising:
determining cross-coupling characteristics of a focus actuator and a tracking actuator of an optical pickup unit; and
determining a decoupling matrix to decouple the focus actuator and the tracking actuator.

27. (Original) The method as recited in Claim 26, further comprising:
determining a focus control law variable of the focus actuator, the focus control law variable for determining focus control commands for controlling a focus position of an optical pickup unit; and
determining a tracking control law variable of the tracking actuator, the tracking control law variable for determining tracking control commands for controlling a tracking position of the optical pickup unit.

28. (Original) The method as recited in Claim 27, wherein determining the focus control law variable comprises:
determining one or more focus forces to be applied to the focus actuator as the focus control commands; and
measuring the results of the one or more focus forces on the focus position; and
determining gain factors relating to the results of the one or more focus forces on the focus position.

29. (Original) The method as recited in Claim 27, wherein determining the tracking control law variable comprises:

determining one or more tracking forces to be applied to the tracking actuator as the tracking control commands; and

measuring the results of the one or more tracking forces on the tracking position; and

determining gain factors relating to the results of the one or more tracking forces on the tracking position.

30. (Original) The method as recited in Claim 26, wherein determining the cross-coupling characteristics comprises:

determining one or more focus forces to be applied the focus actuator as the focus control commands;

measuring the results of the one or more focus forces on the tracking position;

determining a specific process relating to the results of the one or more focus forces on the tracking position;

determining one or more tracking forces to be applied to the tracking actuator as the tracking control commands;

measuring the results of the one or more tracking forces on the focus position; and

determining another specific process relating to the results of the one or more tracking forces on the focus position.

31. (Previously Presented) An optical disk drive comprising:

a lens assembly;

a focus actuator that is configured to move the lens assembly in a focus direction;

a tracking actuator that is configured to move the lens assembly in a tracking direction; and

a decoupler configured to decouple the focus actuator from the tracking actuator by reducing signal cross coupling.

32. (Original) The optical disk drive, as recited in Claim 31, wherein the decoupler modifies a focus command to have a reduced effect on a tracking position of the lens assembly and

modifies a tracking command to have a reduced effect on a focus position of the lens assembly.

33. (Original) The optical disk drive as recited in Claim 31, wherein the decoupler is a software routine stored on computer readable media.

34. (Original) The optical disk drive as recited in Claim 31, wherein the decoupler is an analog circuit.

35. (Original) The optical disk drive as recited in Claim 31, wherein the decoupler is an electro-mechanical circuit.

36. (Original) An optical disk drive comprising:

means for determining cross-coupling characteristics of a focus actuator and a tracking actuator; and

means for determining a decoupling matrix to decouple the focus actuator and the tracking actuator.

37. (Original) The optical disk drive, as recited in Claim 36, further comprising:

means for determining focus control laws of the focus actuator, the focus control laws for determining focus control commands for controlling a focus position of an optical pickup unit; and

means for determining tracking control laws of the tracking actuator, the tracking control laws for determining tracking control commands for controlling a tracking position of the optical pickup unit.

X. EVIDENCE APPENDIX (37 C.F.R. § 41.37(c)(1)(ix))

None.

XI. RELATED PROCEEDINGS APPENDIX (37 C.F.R. § 41.37(c)(1)(x))

None.